

CLAIMS

1. A ceramic pin for transferring controlled volumes of a liquid from a tip thereof to a substrate, the ceramic pin defining a through hole extending to said tip, wherein the diameter of the through hole is at a minimum at said tip of the pin.
2. A ceramic pin according to claim 1, wherein the through hole is of a uniform diameter along the whole length of the pin.
3. A ceramic pin for transferring controlled volumes of a liquid from a tip thereof to a substrate, the ceramic pin defining a capillary for holding liquid, wherein the capillary extends to said tip of the pin.
4. A ceramic pin for transferring controlled volumes of a liquid from a tip thereof to a substrate, the tip of the pin having a face angle of less than four degrees, preferably substantially zero degrees.
5. A ceramic pin for transferring controlled volumes of a liquid from a tip thereof to a substrate, the tip of the pin defining a contact face substantially perpendicular to the longitudinal axis of the pin.
6. A liquid transfer pin for transferring controlled volumes of liquid from a distal end thereof to a substrate, wherein the pin defines a longitudinal capillary for holding liquid, a distal portion of the capillary being selectively open in at least one radial direction.
7. A liquid transfer pin for transferring controlled volumes of liquid from a distal end thereof to a substrate, wherein the pin defines a longitudinal capillary for holding liquid, a distal portion of the capillary being selectively adapted for preventing blockage by particulates.
8. A liquid transfer pin for transferring controlled volumes of liquid from a distal end thereof to a substrate, wherein the pin defines a longitudinal capillary for

holding liquid, a distal portion of the capillary being adapted to facilitate the removal of blockages.

9. A use of a pin according to any preceding claim for the transfer of controlled volumes of liquid to a substrate.
10. A use of a pin according to any preceding claim in a method of transferring controlled volumes of liquid to a substrate by contacting the tip of the pin with the substrate.
11. A use of a pin according to any preceding claim for the transfer of controlled volumes of a biological reagent to a substrate.
12. A use of a pin according to any preceding claim for the transfer to a substrate of controlled volumes of polynucleotide sequences, distinct nucleic acid strands or proteins.
13. A liquid transfer tool including a liquid transfer pin defining a capillary for holding liquid and a holder for holding said pin in a predetermined manner, said holder including at a distal end thereof a longitudinal recess for receiving a proximal end of said pin, and including a radial vent hole in communication with said capillary via said recess.
14. A robotic device for automatically filling at least one capillary pin of a liquid transfer tool by dipping the tip of the pin in a source of the liquid, wherein the speed at which the pin is dipped into the source of the fluid is adjustable.
15. A robotic device for automatically filling at least one capillary pin of a liquid transfer tool by dipping the tip of the pin in a source of the liquid, wherein the length of time for which the tip of the pin is held in source of the fluid is adjustable.
16. A robotic device for automatically filling at least one capillary pin of a liquid transfer tool by dipping the tip of the pin in a source of the liquid, wherein the volume of liquid taken up by the capillary is adjustable.
17. A robotic device for automatically filling at least one capillary pin of a liquid transfer tool by lowering the pin into a source of the liquid to be transferred and

then raising the pin out of the source of liquid, wherein the device includes means for detecting the depth to which the at least one capillary pin is dipped into the source of liquid, and wherein the robotic device is programmed to determine the length of time for which the tip of the pin is to be held in the source of fluid between the lowering and raising operations according to at least one parameter including the detected depth.

18. A robotic device according to claim 17, wherein the depth to which the at least one capillary pin is dipped into the source of liquid is detected by measuring the level of the liquid surface with respect to a reference point.
19. A method of operating a robotic device for filling at least one capillary pin of a liquid transfer tool by dipping the tip of the at least one capillary pin into a source of the liquid, the method including the steps of: storing in a memory of a computer of the robotic device data for determining the time for which the at least one capillary pin is to be dipped into the source of liquid; and inputting at a user interface one or more parameters relating to the desired pick-up volume; wherein the computer is operable to determine on the basis of said parameters the time for which the at least one capillary pin is to be dipped into the source of liquid.
20. A robotic device for automatically filling at least one capillary pin of a liquid transfer tool by dipping the tip of the at least one capillary pin into a source of the liquid, wherein the robotic device includes a user interface for a user to input one or more parameters relating to the desired pick-up volume, and a computer that is operable to determine on the basis of said one or more parameters the time for which the at least one capillary pin is to be dipped into the source of liquid.
21. A method of cleaning a liquid transfer tool including an array of capillary pins for transferring controlled volumes of liquid from tips thereof to a substrate, the method including inserting the tips of the pins into respective counterbores connected to a vacuum pump, each counterbore provided with a sealing ring, wherein the relative dimensions of the counterbores and the sealing rings are selected so as to allow for mis-alignments between the pins and the centre axes of

the counterbores whilst ensuring a good seal between each counterbore and the respective pin.

22. A ceramic capillary pin for transferring controlled volumes of liquid to a substrate surface by the method of filling the capillary pin with the liquid to be transferred, contacting the tip of the pin with the substrate surface and then distancing the tip of the pin from the substrate surface at least until the fluid ligament connecting the tip of the pin and the substrate surface is broken, wherein the capillary pin has a tip that is shaped so as to maximise the consistency of the position of the fluid ligament with respect to the pin axis.